

AMENDMENTS TO THE DRAWINGS:

The attached one (1) sheet of drawings includes changes to Figure 1. Figure 1 has been amended herein to even more clearly illustrate that a wall thickness of a valve sleeve 5 at an inflow-side region 25 has a heavier design than a downstream region 26, as described, for example, on page 4 lines 8 to 13 of the Specification. No new matter has been added.

Attachment: One (1) Replacement Sheet

REMARKS

I. Introduction

With the cancellation herein without prejudice of claims 9, 11, and 13, claims 8, 10, 12, and 14 are pending in the present application. In view of the foregoing amendments and the following remarks, it is respectfully submitted that all of the presently pending claims are allowable, and reconsideration is respectfully requested.

Applicant notes with appreciation the acknowledgment of the claim for foreign priority and the indication that all copies of the certified copies of the priority documents have been received from the International Bureau.

II. Objection to the Drawings

As regards the objection to the drawings, the Examiner will note that Figure 1 has been amended herein to even more clearly illustrate that a wall thickness of a valve sleeve 5 at an inflow-side region 25 has a heavier design than a downstream region 26, as described, for example, on page 4 lines 8 to 13 of the Specification. No new matter has been added. In view of the foregoing, withdrawal of this objection is respectfully requested.

III. Rejection of Claims 8, 9, and 11 to 13 Under 35 U.S.C. § 102(b)

Claims 8, 9, and 11 to 13 were rejected under 35 U.S.C. § 102(b) as anticipated by U.S. Patent Application Publication No. 2002/0170987 ("Aoki et al."). It is respectfully submitted that Aoki et al. do not anticipate the present claims as amended herein for at least the following reasons.

As an initial matter, claims 9, 11, and 13 have been canceled herein without prejudice, thereby rendering moot the present rejection with respect to claims 9, 11, and 13.

Claim 8, which relates to a fuel injector, has been amended herein without prejudice to recite that the wall thickness of a valve sleeve decreases in a discharge direction of the fuel, a radial cross section of the valve sleeve decreases between an inflow-side region and a discharge-side region on a collar that separates the inflow-side region having greater material strength from the discharge-side region having lower material strength, and a supply pipe is inserted into the valve sleeve in the inflow-side region, which has the heavier design. These features are

supported by claims 9, 11, and 13, which have been cancelled herein without prejudice. Further support for this amendment may be found, for example, on page 4, lines 15 to 18 and 24 to 26 of the specification.

Aoki et al. aim to decrease fuel adhesion to a tip portion of an injector (see, e.g., paragraph 0008). As such, Aoki et al. disclose an injector having an orifice plate with plural orifices, from which a highly atomized fuel is injected, a portion of which adheres to a tip portion of the injector. A negative pressure forming section is formed downstream from the injector orifice plate as the fuel is injected from the orifices. A recovery section conducts the adhered fuel toward outlets of the orifices by utilizing a negative pressure developed in the negative pressure forming section. The adhered fuel flows through the recovery section and is returned to a main jet formed from the orifices. As a result, the amount of fuel adhered to the injector tip is suppressed.

In contrast to the disclosure of Aoki et al., an aspect of the fuel injector of the present application is to limit noise emissions. Due to flexural vibrations, fuel injectors have a tendency to emit interfering noise during operation. This is caused by the shape of the valve sleeve which has a support function on the one hand, but on the other hand must be thin enough in its material thickness to allow a satisfactory build-up of the magnetic field in the region of the working air gap.

Therefore, a fuel injector is provided according to the present application which is adapted to the specific requirements in the various regions. Thus, resonances are attenuated so that the noise development is dampened as well. This has no negative effect on the stability of the valve sleeve and the saturation behavior of the magnetic field in the region of the working air gap. Since the region having a greater material strength has a larger cross section than the region having a thinner wall thickness, a higher stability of the valve sleeve is achieved.

Moreover, the fuel injector according to the present application differs from the injector disclosed by Aoki et al. in that a supply pipe is inserted into the valve sleeve, which surrounds the armature and the valve needle, in the inflow-side region which has the heavier design to provide support and stability in this connecting region. According to Aoki et al., however, the sleeve extends not only around the armature and the valve needle, but also extends to the fuel inlet. Therefore, the supply pipe and the valve sleeve according to Aoki et al. is an

integrally formed one-piece construction. Moreover, the part of the sleeve disclosed by Aoki et al. that has the greatest material strength is provided around a filter member which is arranged at the fuel inlet side of the sleeve. The wall thickness of the sleeve as well as its diameter then remains constant around the region of the armature. At the downstream end of the sleeve, a portion with reduced wall thickness -- but also a larger inner diameter -- is provided in the region of the valve seat. Considering these variations in wall thickness and diameter, the valve sleeve disclosed by Aoki et al. is not intended to be adapted to specific requirements in various regions to attenuate resonances and dampen noise development.

In view of all of the foregoing, it is respectfully submitted that Aoki et al. do not anticipate claim 8 or any claim that depends from claim 8.

In view of all of the foregoing, withdrawal of this rejection is respectfully requested.

IV. Rejection of Claims 10 and 12 to 14 Under 35 U.S.C. § 103(a)

Claims 10 and 12 to 14 were rejected under 35 U.S.C. § 103(a) as unpatentable over U.S. Patent Application Publication No. 2002/0170987 ("Aoki et al."). It is respectfully submitted that Aoki et al. do not render unpatentable the present claims for at least the following reasons.

As an initial matter, claim 13 has been cancelled herein without prejudice, thereby rendering moot the present rejection with respect to claim 13.

As more fully set forth above, claim 8, from which claims 10, 12, and 14 depend, has been amended herein without prejudice to recite that the wall thickness of a valve sleeve decreases in a discharge direction of the fuel, a radial cross section of the valve sleeve decreases between an inflow-side region and a discharge-side region on a collar that separates the inflow-side region having greater material strength from the discharge-side region having lower material strength, and a supply pipe is inserted into the valve sleeve in the inflow-side region, which has the heavier design. As more fully set forth above, the disclosure by Aoki et al. does not disclose or even suggest all of these features. Furthermore, it is not intended to be adapted to specific requirements in various regions to attenuate resonances and dampen noise development. As such, it is respectfully submitted that Aoki et al. do not render unpatentable claims 10, 12, and 14, which depend from claim 8.

Claims 10, 12, and 14 ultimately depend from claim 8. Therefore it is respectfully submitted that Aoki et al. do not render unpatentable these dependent claims for at least the same reasons more fully set forth with respect to claim 8.

In view of all of the foregoing, withdrawal of this rejection is respectfully requested.

V. Rejection of Claim 11 Under 35 U.S.C. § 103(a)

As regards the rejection of claim 11, claim 11 has been canceled herein without prejudice, thereby rendering moot the present rejection. Withdrawal of this rejection is therefore respectfully requested.

VI. Conclusion


It is therefore respectfully submitted that all of the presently pending claims are allowable. All issues raised by the Examiner having been addressed, an early and favorable action on the merits is earnestly solicited.

Respectfully submitted,

Date:

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